

LEPTOSPIROSIS

DISEASE REPORTING

In Washington

DOH receives 0 to 2 reports of leptospirosis per year. Exposures identified in Washington include contact with animals, contaminated water, or soil contaminated with urine from rats or dogs.

Purpose of reporting and surveillance

- To identify sources of infection (e.g., animals or contaminated water) and prevent further transmission from such sources.
- To design more effective control and prevention methods.
- To better characterize the epidemiology of these organisms.

Reporting requirements

- Health care providers: notifiable to Local Health Jurisdiction within 3 work days
- Hospitals: notifiable to Local Health Jurisdiction within 3 work days
- Laboratories: no requirements for reporting
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days

CASE DEFINITION FOR SURVEILLANCE

Clinical criteria for diagnosis

An illness characterized by fever, headache, chills, myalgia, conjunctival suffusion, and less frequently by meningitis, rash, jaundice, or renal insufficiency. Symptoms may be biphasic.

Laboratory criteria for diagnosis

- Isolation of *Leptospira* from a clinical specimen, or
- Fourfold or greater increase in *Leptospira* agglutination titer between acute- and convalescent-phase serum specimens obtained ≥ 2 weeks apart and studied at the same laboratory, or
- Demonstration of *Leptospira* in a clinical specimen by immunofluorescence.

Case definition

- Probable: a clinically compatible case with supportive serologic findings (i.e., a *Leptospira* agglutination titer of ≥ 200 in one or more serum specimens).
 - Confirmed: a clinically compatible case that is laboratory confirmed.
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A. DESCRIPTION**1. Identification**

A group of zoonotic bacterial diseases with protean manifestations. Common features are fever with sudden onset, headache, chills, severe myalgia (calves and thighs) and conjunctival suffusion. Other manifestations that may be present are diphasic fever, meningitis, rash (palatal exanthem), hemolytic anemia, hemorrhage into skin and mucous membranes, hepatorenal failure, jaundice, mental confusion and depression, myocarditis and pulmonary involvement with or without hemoptysis. In areas of endemic leptospirosis, a majority of infections are clinically inapparent or too mild to be diagnosed definitively.

Cases are often misdiagnosed as meningitis, encephalitis or influenza; serologic evidence of leptospiral infection is found among 10% of cases with otherwise undiagnosed meningitis and encephalitis. Clinical illness lasts from a few days to 3 weeks or longer. Generally, there are two phases in the illness; the leptospiremic or febrile stage, followed by the convalescent or immune phase. Recovery of untreated cases can take several months. Infections may be asymptomatic; severity varies with the infecting serovar. Case-fatality rate is low but increases with advancing age and may reach 20% or more in patients with jaundice and kidney damage who have not been treated with renal dialysis; deaths are due predominantly to hepatorenal failure, vascular abnormalities with hemorrhage, adult respiratory distress syndrome or cardiac arrhythmias due to myocarditis.

Different types of leptospires tend to occur in different locales, so serologic tests should utilize a panel of locally occurring leptospires. Difficulties in diagnosis have compromised disease control in a number of settings and resulted in increased severity and elevated mortality. Diagnosis is confirmed by rising titers in specific serologic tests, such as the microscopic agglutination test, and by isolation of leptospires from blood (first 7 days) or CSF (days 4-10) during the acute illness, and from urine after the 10th day, by using special media. Inoculation of young guinea pigs, hamsters or gerbils is often positive. IF and ELISA techniques are used for detection of leptospires in clinical and autopsy specimens.

2. Infectious Agent

Leptospires, members of the order Spirochaetales. Pathogenic leptospires belong to the species *Leptospira interrogans*, which is subdivided into serovars. More than 200 serovars have been identified, and these fall into about 23 serogroups based on serologic relatedness. Important changes in leptospiral nomenclature are being made, based on

DNA relatedness. Commonly identified serovars in the US are icterohaemorrhagiae, canicola, autumnalis, hebdomidis, australis and pomona. In the UK, New Zealand and Australia, *L. interrogans* serovar hardjo infection in humans is the most common among those in close contact with infected livestock.

3. Worldwide Occurrence

Worldwide; in urban and rural, developed and developing areas, except for polar regions. The disease it is an occupational hazard for rice and sugarcane fieldworkers, farmers, sewer workers, miners, veterinarians, animal husbandrymen, dairymen, abattoir workers, fish workers and military troops; outbreaks occur among those exposed to fresh river, stream, canal and lake water contaminated by urine of domestic and wild animals, and to urine and tissues of infected animals. The disease is a recreational hazard to bathers, campers and sportsmen in infected areas, and predominantly a disease of males, related to occupation. It appears to be increasing among urban children. A major outbreak in Nicaragua in 1995 caused extensive mortality. In 1997 and 1998 outbreaks were reported in India, Singapore, Thailand and Kazakhstan.

4. Reservoir

Wild and domestic animals; serovars vary with the animal affected. Notable are rats (icterohaemorrhagiae), swine (pomona), cattle (hardjo), dogs (canicola) and raccoons (autumnalis). In the US, swine appear to be the reservoir hosts of bratislava; in Europe, also badgers. Alternative animal hosts with usually shorter carrier states abound and include feral rodents, deer, squirrels, foxes, skunks, raccoons, opossums and marine mammals (sea lions). Serovars infecting reptiles and amphibians (frogs) have not been shown to infect humans but have been suspected in Barbados and Trinidad. In carrier animals, an asymptomatic infection occurs in the renal tubules, with leptospiuria persisting for long periods or, especially in reservoir species, for life.

5. Mode of Transmission

Contact of the skin, especially if abraded, or of mucous membranes with water, moist soil or vegetation, especially sugarcane contaminated with urine of infected animals, as in swimming, accidental immersion or occupational abrasion; direct contact with urine or tissues of infected animals; occasionally through ingestion of food contaminated with urine of infected rats; and occasionally by inhalation of droplet aerosols of contaminated fluids.

6. Incubation period

Usually 10 days, with a range of 4-19 days.

7. Period of communicability

Direct transmission from person to person is rare. Leptospire may be excreted in the urine, usually for 1 month, but leptospiuria has been observed in humans and in animals for as long as 11 months after the acute illness.

8. Susceptibility and resistance

Susceptibility of humans is general; immunity to the specific serovar follows infection or (occasionally) immunization, but this may not protect against infection with a different serovar.

B. METHODS OF CONTROL**1. Preventive measures:**

- a. Educate the public on modes of transmission, to avoid swimming or wading in potentially contaminated waters and to use proper protection when work requires such exposure.
- b. Protect workers in hazardous occupations by providing boots, gloves and aprons.
- c. Recognize potentially contaminated waters and soil and drain such waters when possible.
- d. Control rodents in human habitations, especially rural and recreational. Burn sugarcane fields before harvest.
- e. Segregate infected domestic animals; prevent contamination of human living, working and recreational areas by urine of infected animals.
- f. Immunization of farm and pet animals prevents illness, but not necessarily infection and renal shedding. The vaccine must contain the dominant local strains.
- g. Immunization of people has been carried out against occupational exposures to specific serovars in Japan, China, Italy, Spain, France and Israel.
- h. Doxycycline has been shown in Panama to be effective in preventing leptospirosis in exposed military personnel when administered in an oral dose of 200 mg once weekly during periods of high exposure.

2. Control of patient, contacts and the immediate environment:

- a. Report to local health authority.
- b. Isolation: Blood and body fluid precautions.
- c. Concurrent disinfection: Articles soiled with urine.
- d. Quarantine: None.
- e. Immunization of contacts: None.
- f. Investigation of contacts and source of infection: Search for exposure to infected animals and potentially contaminated waters.
- g. Specific treatment: Penicillins, cephalosporins, lincomycin and erythromycin are inhibitory in vitro. Doxycycline and penicillin G have been shown to be effective in

double blind placebo controlled trials; penicillin G and amoxicillin were effective as late as 7 days into an illness. Prompt specific treatment, as early in the illness as possible, is essential.

3. Epidemic measures

Search for source of infection, such as a contaminated swimming pool or other water source; eliminate the contamination or prohibit use. Investigate industrial and occupational sources, including direct animal contact.

4. International measures

WHO Collaborating Centres.